CLASSROOM QUESTIONING BEHAVIOUR—A REVIEW

Prepared for the ERIC Project on effect of classroom behaviour training on the classroom questioning behaviour of teachers

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FOREWORD

Use of questions in classroom instruction hardly needs any emphasis. It is being used for various instructional purposes since long. As a matter of fact, questioning is considered to be a potential instructional tool in the hands of the teachers. Use of questions in classroom instruction, has attracted the attention of educational thinkers, practitioners and research workers Dr. N.K. Jangira, Reader and Shri N. , Dhoudiyal, Research Fellow in the Department undertook a research project, entitled "Effect of Classroom Behaviour Training (CBT) on Classroom Questioning Behaviour of Teachers". In connection with this study, the project team reviewed literature pertaining to questioning in the context of instruction. The present monograph is based on this review. The first section gives research review covering such aspects as incidence of classroom questions, context-process relationships conc concerning classroom questions, and presage-process research in the area. The second section gives annotated bibliography covering over 150 references.

I appreciate the efforts of Dr. N.K. Jangira and Shri N.C N.C. Dhoundiyal for this effort. It is hoped that the review will be of use to research workers and educational practitioners.

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24 November, 1980
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SECTION - I

REVIEW OF RESEARCH

1.00 THE FRAMEWORK

1.01 Classroom questions happen to be one of the most important tools of teaching. The potentiality of questioning as a means of teaching can be assessed from the way it was used in "Shastrarth" with pupils as paractised by the ancient Indian gurus and by Socrates. It assumes further significance in the context of teaching by another important factor governing the adoption and use of teaching techniques in our classrooms. It is basically a verbal behaviour based technique. Its use, therefore, does not involve financial implications of a higher order. The only financial input is in the form of organising training in classroom questioning behaviour. This investiment is much lower than what is required in the introduction of equipment and material. This does not imply that we can dispense with equipment and materials from teaching altogether. The intention is that if classroom questioning can be made effective through training input, the return can be reasonably satisfactory. The training, however, is to be carefully designed and faithfully executed to ensure its effectiveness. This objective can be achieved through the preparation of a sound conceptual framework, development of effective training strategies, and empirical validation of the two.

1.02 The potentiality of classroom question as an instructional tool led to various studies relating to its use in the classroom - incidence of questions in the classroom, their structure, their level, the delivery process and the management of pupil reponses. This type of work can be traced back to the study of the questioning behaviour of no less a person than Socrates himself whose questioning blazed a new trail in the methodology of teaching. The pedagogists lahelled this effort as the Socratic method of teaching. The process continued in various forms as a part of different methods of teaching. The systematic study of classroom questioning behaviour of teachers in in its own right, however, started towards the end of the first half of the present (Coray, 1940).

It will be worthwhile to have an overview of research on various aspects of the classroom questioning behaviour of teachers, identify the strengths and weaknesses of an studies and pinpoint the gaps for further research in this vital area of teaching. The present review is directed to this end.

1.03 Like other reviewers of research, we also faced the difficulty to lay our hands on the original reports of the studies. We could do so only in respect of studies that were published in journals in India and abroad. Due to non-availability of research reports in all the cases, we had to bank upon the review appearing from time to time. The specific details were lacking since the reviews focussed on the limited purpose for which they were prepared. The major reviews published in India and abroad (Biddle 1964; Flanders 1969; Rosenshing 1972; 1979; Dunkin and Biddle 1974; Jangira 1974; 1979; Buch 1970; 1975; Padma 1979) served as the source for this review in addition to the studies published independently or in journals. The studies in the area of teacher behaviour covering classroom questioning behaviour have also been included in the review. within these constraints, the review presents an overview of the research in the area of classroom questioning behaviour.

..04 Before taking up the research review proper, it will be desirable to develop the framework. The framework will have to take various aspects of classroom questioning behaviour into consideration. The classroom questioning behaviour can be analysed into two types of components. Firstly, it can be considered in relation to the types of variables like presage, context and product. The presage variables include the entry characteristics of the teachers personality, demographic, education and training. The context variables cover grade and size of the class, content area, pupil characteristics and institutional context. Product variables refer to the pupil outcomes. Another dimension of classroom questioning refers to the structuring of the questions, levels of questions, question delivery and management of pupil responses. A general dimension of the classroom questioning behaviour is its incidence during teaching-occurrence of classroom questions in a teaching unit or a unit time. This review covers classroom questioning behaviour in relation to presage, context and product variables as well as the general dimension of incidence. The technology of classroom questioning-structuring at different levels, delivery and management of pupil responses will be referred to wherever they are relevant and included in the studies under review.

2.00 INCIDENCE OF CLASSROOM QUESTION

2.01 The incidence of classroom questions refers to their occurrence per teaching unit or per unit time. The findings of the study have been summarised in table 1. The table gives the investigator and year of the study of incidence variables specified in the study, the incidence of the different levels of question studied and the findings.

Table 1. Incidence of questions in classroom

Investigation	Incidence Variables	Findings
Baden(1974)	Frequency of probing questions	0.3 to 22.0 questions per 30 minutes instructional period (mean=11.2)
Bellman(1975)	Frequency of higher question in usual classrooms.	22% of total questions
Bramner(1974)	Information and leading questions in secondary schools social studiesclasses T.R.(FIACS)	In 90% of the classes the teacher's questions were at information and leading levels.
Buch(1975)	TOR (FIACS)	16.32
Buch and Santhaman(1970)	Percentage of total tallies in category 4 (FIACS)	8.25%
Buch & Quraishi(1970)	Percentage of total tallies in category '4 (FIACS)	8.25%
Corey(1940)	Frequency of question.	One question per 72 seconds.
Devis and Tinsley(1967)	Order of frequency of questions at different levels.	Memory interpretation and translation, procedurel and evaluation questions.
Friedman(1977)	Frequency of higher level questions.	Madium no-zero
Gallagher 1965)	Percentage of recall and evaluative questions.	recall questions 50% evaluation questions 20%
Galloway 1973)	Percentage of memory and higher level questions.	Memory questions 74.3%.

Guzzak(1967)	Percentage of recall questions	Higher level questions-recall questions 42%
Guszak(1968)	Percentage of recall questions	Recall questions 57%
Haynes(1935)	Percentage of questions asked to stimulate recall and higher level thinking.	Recall questions 77% higher level questions 17%
Jangira(1979)	TOR (FIACS)	9.12
Jangira(1980)	Questions per month	One questions per 2.2 minutes.
John(1970)	Percentage of memory questions	Memory question 54%
Pareek & Rao (1970)	Percentage of questions	[illegible].84% total verbal talk. 16.16 total teacher talk.
Resnick(1972)	Percentage of questions	36 of total teacher talk.
Santhanam and Quaraishi(1970)	Percentage of total tallies in category 4 (FIACS)	9.30%
Schreiben (1967)	Percentage of recall question	40% of total teacher questions
Smith and Meux (1962)	Proportion of recall and higher questions	recall questions 2/3 of total questions higher questions 1/3 of total questions.
Thakar(1973)	Percentage of question at different levels.	Memory question 29.3% translalation questions 1.9% interpretation question 8.8%
Verma & Annar (1975)	Percentage of total tallies in category (FIACS)	8.81%

2.02 The table indicates that 24 studies gave data regarding the incidence of classroom questions. These studies also include the ones conducted in the area of teacher behaviour where questioning formed one of the areas of study. Out of these studies 11 investigated the frequency of classroom questions without any consideration to their levels. The task of interpreting the findings become different since the index of incidence used in the studies is not uniform. In some studies the index implies percentage of questions while in others frequency per unit time has been used. In yet another set of studies Teacher Question Ration (TOR) or percentage of questions to the total teacher talk (FIACS) has been used.

2.03 Buch (1975) observed the classroom interaction patterns in classroom using FIACS. The TOR was found to be 16.32 which lower in comparision with the other rations reported in the studies. Jangira (1977) observed the teaching behaviour of student teachers and obtained TOR of 9-12 which is even less than Buch (1975). The studies conducted by Buch amd Santhanam (1970). Santhanam amd Quarshi (1970) and Verma and Ansari (1973) have reported percentage of tallies in category 4 (ask questions) of the FIACS. The percentage ranges between 8-25 to 9-38. This reveals a comparatively low level of time devoted to questioning. Pareek and Rao (1970) amd Resnick (1972) also indicated low percentage of question asked to the total verbal talk as well as teachers verbal talk. Corey (1940) reports that one question per 72 second is asked by the teacher in the classroom.

2.04 Fourteen studies have given the frequency of different types and levels of classroom questions. The frequency of lower level (recall, information, factual, leading questions) has been given by Naynes (1935), Smith and Maux (1962), Gallapher (1965), Guszak (1967, 1968) Schrabar(1967), Guszak Galloway (1973), Thakar (1973) Bramner (1974) and Jangira (1980). A common finding among all of these studies is that a higher percentage of teachers questions fall into the categories which stimulate only lower level of cognitive functioning in the pupils.

2.05 The findings of the study have to be taken with a caution due to the variability in the incidence of the indices used in the studies. Secondly, level at which the studies have been conducted covered in different studies is not known. Thirdly data regarding the sampling of teacher behaviour is not available. However, the table points to the trend of low incidence of questions beyond recall or information. If questions are at all capable of stimulating different levels of cognitive functioning of pupils, and if our educational objectives demand pupils to develop thinking beyond memory level the situation is far from satisfactory.

3.00 Presage Variables and Classroom Questioning Behaviour

3.01 Studies seeking relationship between presage variables like age, sex and qualifications of teachers, their indirectness, creativity level, introversion-extroversion, attitude towards teaching, instructional goal perception, and effectiveness have been presented in table 11 below. The table provides identification data, process variables relating the classroom questioning behaviour and findings.

Presage Variables and Classroom Questioning Behaviour of Teachers.

Presage Variable	Investigation	Process Variable(s)	Finding(s)
Age	Shashikala (1978)	TOR (FIACS)	Significant Positive Correlation
Sex	Mehta (1976)	TOR (FIACS)	Relationship not significant
	Santhanam et al (1970)	Time devoted to asking questions	Female teachers devote more time in asking questions (10.82%) than male teachers (8.25%)
Education & Training	Mehta (1976)	TOR (FIACS)	TOR in respect of post-graduate teachers is significantly higher than graduate teachers.
	Thakar (1973)	Frequency of questions at different levels.	Trained teachers asked significantly more higher level questions than untrained teachers who asked more lower level questions.
Creativity	Hanson (1976)	Frequency of classroom questions.	High creativity group asked significantly more questions than low creativity group.
	Mathew (1976)	TOR (FIACS)	Relationship not significant

	Torrance and Hansen (1965)	Frequency of question at: 1) Divergent level	Significant difference (high creativity group asked more questions)
		11) Factual level	Significant difference (low creativity group asked more questions).
Direct vs Indirect	Kaul (1975)	Time devoted to higher order questions	Direct teachers-0.18% indirect teachers 0.35%
	Kumar (1976)	Frequency of questions at:- 1) Memory level.	Significant difference (Direct teachers asked more memory questions).
		11) Interpretation level, Application level, Analysis level.	Significant difference. (Indirect teachers asked more questions in these categories).
Introvert vs. Extrovert teachers.	Goel (1970)	Frequency of classroom questions	Significant difference (extrovert teachers asked more questions).

Attitude towards teaching	Singh (1974)	TQR and instantaneous teacher question ratio (FIACS)	Significant positive relationship
Effective ineffective teacher	Maheshwari (1976)	Frequency of questions	Significant difference (Effective teachers asked more questions)
Instructional Goal Perception	Mehta (1976)	TQR (FIACS)	Relationship not significant

3.02 The table indicates that age of the teacher is positively related to TQR worked out on the basis of FIACS which implies that the time devoted to questions in the classroom increases with the age of the teacher. The findings in respect of the relationship between sex of the teacher and TQR are contradictory. While one study points to females teachers devoting more time to asking questions than their male counterparts, another study reports non significant relationship. As the first study also does not indicate specifically the significance of the difference between the classroom questioning behaviour of male and female teachers, the findings may be considered inadequate. More data is needed to conclude on these variables.

3.03 T[illegible]d on FIACS has been found to be significantly higher in the case of teachers having post-graduate degree than those having graduate degree (Mehta-1976). In another study trained teachers are reported to have asked significantly more higher order questions than untrained teachers (Thakar 1973). This appears to be a tribute to training. However, studies with large samples will be required to finally draw generalised conclusions in this respect.

3.04 The studies on creativity and classroom questioning provide a mixed bag of findings. However, two findings are quite significant in this area. High creativity group of teachers tend to ask significantly more questions than low creativity group. Further, high creativity group of teachers are reported to have asked more divergent questions and low creativity group tend to ask more questions at memory level. The third study found no significant relationship between creativity of teachers and TQR (Mathew 1976).

3.05 The studies on indirectness of teacher behaviour and their classroom questioning behaviour indicate that indirect teacher devote more time to questioning than direct teachers and direct teachers ask more memory level questions than indirect teachers who tend to ask significantly more questions at levels beyond memory.

3.06 Extrovert teachers are found to be asking more questions than their introvert counterpart. Teachers attitude towards teaching is reported to be significantly and positively related to TQR based on FIACS. Teachers judged to be effective tend to ask more questions. However, instructional goal perception of teachers was not found to be significantly related to TQR.

3.07 The studies reviewed in this section have revealed some relationships between presage variables and the classroom questioning behaviour of teachers. But the variables included in the studies, particularly those relating to teachers personality, are limited. More variables need to to be studied to explore this area of research.

4.00 Context-Process Studies on Classroom Questioning Behaviour

4.01 This section includes reviews on Context-Process studies in the area of classroom questioning behaviour. As pointed out in (1.04), these studies covered grade level and curricular area as independent variables, while variables relating to different aspects of classroom questioning constituted the independent variables. Table 111 summarising these studies includes identification data concerning the studies, specifies context and process variables in respective studies and gives findings in brief.

Table 111

Context-Process Studies on Teachers' Classroom Questioning Behaviour.

Context Variable	Investigation	Process Variable(s)	Findings
Grade Level			
High School vs Junior High School	Ad (1964)	Frequency of questions	High School teachers asked more question than high school teachers
High School vs. Junior High School	Davis and Tinsley (1967)	Frequency of questions at translation, evaluation	Significant difference (Junior high school student teachers asked more questions at each of these levels.

Elementary vs. Secondary School	John (1970)	Frequency of questions	Elementary school teachers asked more questions than secondary school teachers.
CURRICULAR AREA			
Social Studies vs. English	Adams (1964)	Frequency of memory questions	Social studies teachers ask more memory questions than English teachers.
Social Studies vs. Humanities teachers	Kuma (1976)	Frequency of questions at different levels.	Difference not significant
Elementary Sci. vs. other elementary school subjects.	Larson (1974)	Frequency of questions at different levels.	Difference not significant
Progressive mathematics vs. Traditional Mathematics.	Sloan and Pate (1966)	Frequency of questions at:	
		a) recall level	Significant difference (traditional mathematics teachers ask more questions than progressive mathematics teachers).
		b) Comprehension and Analysis levels.	Significant difference (Progressive mathematics teachers asked more questions than traditional mathematics teachers).

		c) Recognition Synthesis, opinion, and attitude levels.	Difference not significant.
ORGANISATIONAL CLIMATE	Shashikala (1978)	Frequency of questions	Difference between six types of organisational climate not significant.

4.02 Three studies attempted to find the relationship between level of schools and different process variables relating to classroom questioning. These studies reveal that junior high and elementary school teachers tend to ask more questions than high and secondary teachers. Davis and Tinslay (1967) further indicated that this difference in classroom questioning behaviour persists even when levels of questions (translation and evaluation) are taken into consideration.

4.03 Table 111 indicates a mixed bag of results. Some of the results between curricular areas differ while in others non significant results have been obtained. One study (Adams 1964) reveals that social studies teachers ask more memory level questions than English teachers. The other two studies (Kumar 1976) and Larson (1974) found no significant differences between various curricular areas. Progressive mathematics teachers tend to ask significantly more questions at comprehension and analysis levels than traditional mathematics teachers, while reverse is the case with regard to questions at recall level. This situation may be due to the instructional material on progressive mathematics and the concurrent inservice training. The results at recognition and synthesis levels are not significant. Shashikala (1976) studied an important context variable. The study revealed no significant difference in the classroom questions used in the six types of organisational climates obtaining in schools.

4.04 Context being a wide area, the studies reviewed in this section have covered only a limited number of contextual variables. Variables like class size and pupil characteristics are conspicuous by their absence in the studies. On the face of it, these two sets of variables appear to be quite promising from the view-point of classroom questioning behaviour Studies with these variables will be of interest in future research.

5.00 Process - Product Studies

5.01 This section provides an overview of the studies wherein the type and levels of classroom questions comprise the independent variables and pupil outcomes as dependent variables. Both, correlational as well as experimental studies have been covered. Some studies have covered type and levels of questions perse while a few have taken teaching patterns involving questions. Table I/ summarises these studies. The table includes identification data in respect to the studies, type and level of questions or teaching patterns, pupil achievement variables and main findings.

Table - IV
Process-Product Studies on Teacher's Classroom Questioning Behaviour

Investigation	Process Variable(s)	Product Variable(s)	Finding(s)
	TYPES AND LEVELS OF QUESTIONS	PUPIL COGNITIVE ACHIEVEMENT	
ALLEN (1969)	Proportion of substantive interchanges classified as Translation, Interpretation, Application.	Pupil achievement	Relationship not significant.
Adams (1975)	High vs Low level of questions	Critical thinking	Difference not significant.
Friedman (1977)	High vs Low frequency of application questions.	Pupil achievement at different levels.	Significant difference (High frequency group scored higher).
	High vs Low frequency of memory questions.	Pupil achievement at memory level.	Significant difference (High frequency group scored higher).
		Pupil achievement at other levels.	Difference not significant
	High vs Low frequency of comprehension questions.	Pupil achievement at different levels.	Difference not significant

Investigation	Process Variable (s)	Product Variable(s)	Finding(s)
Hams et-al (1968)	Frequency of "Meaningful Interchanges"	Pupil achievement	Relationship not significant
	Frequency of "Form Interchanges".	Pupil achievement	Relationship not significant.
Harris & Serwer	Frequency of interchanges requiring to 'recognise' a word, sentences or symbol.	Pupil achievement	Relationship not significant.
Kesri (1974)	"Narrow" vs Broad questions.	Pupil achievement at knowledge level.	Significant difference (Narrow questions produced higher scores)
		Comprehension and Application	Significant differences (Broad questions produce higher scores).
Kleinman (1964)	'Factual vs 'High' level questions.	Pupil achievement.	Significant differences among high question pupil (High-level questions produced higher scores).
Marlino (1976)	Levels of questions.	Pupil achievement at understanding level.	Significant positive relationship.

Investigation	Process Variable(s)	Product Variable(s)	Finding(s)
Perkins	Frequency of ques'	Pupil achievement beyond 'Knowledge' level.	Difference not significant.
Perkins (1965)	Frequency of questions about content	Pupil achievement	Relationship not significant
	Frequency of questions to stimulate thinking.	Pupil achievement	Relationship not significant.
Ryan (1974)	High level question vs no questions.	Pupil achievement on 'high level (post test and retention test).	Significant difference (High level questions produced higher scores).
	Low level questions vs no questions	Pupil achievement on 'Low' level (post-test and retention test).	Significant difference (Low level questions produced higher scores).
Soar (1966)	Frequency of eliciting answers of interpretation and generalisation questions.	Pupil achievement	Significant positive relationship
Solomon *et al*	Frequency of ehypothetical questions opinion questions, organising questions and 'non-specific questions'.	Pupil achievement	Relationship not significant
	Frequency of interpretation and factual questions.	Gain in comprehension	Significantly loaded on a factor related to comprehension gains.

sti- n	Process Variable(s)	Product Variable(s)	Finding(s)
ding)	Frequency of questions asking for "Clarification".	Pupil achievement	Significant relationship
	Frequency of asking questions with a 'ready abswer in teacher's mind.	Pupil achievement	Relationship not significant.
er)	Proportion of teacher's moves requiring 'higher cognitive behaviour'.	Pupil achievement	Relationship not significant.
t & ll	Frequency of 'open ended' questions and 'closed ended' questions.	Pupil achievement	Relationship not significant.
	TEACHING PATTERNS WITH OR WITHOUT QUESTIONING	PUPIL COGNITIVE ACHIEVEMENT.	
aborty)	Lecturing-questioning-answering with behavioural objectives vs Lecturing questioning-answering	Pupil achievement on knowledge comprehension, application levels and total achievement (Post-test and retention test)	Significant differences (Lecturing-questioning-answering with behavioural objectives produced higher scores).

Investigation	Process Variable(s)	Product Variable(s)	Finding(s)
	Discussion with instructional objectives vs. Lecturing-questioning-answering approach.	Pupil achievement at application level (post test)	Significant difference (Discussion with instructional objective produced higher scores).
		Pupil achievement at knowledge, comprehension, application (retention test) and total achievement (retention test).	Significant differences (Discussion with instructional objective produced higher scores).
Chasas (1973)	Lecturing vs. discussion with broad questions vs. discussion with narrow questions.	Critical thinking	Difference not significant.
Padma (1976)	Questioning-answering-feedback-problem solving approach vs. lecturing-problem solving approach, Questioning-answering-problem solving approach, and lecturing with no problem solving approach.	Retention of application ability	Significant differences (Questioning-answering-feedback problem solving approach produced higher scores).
Roy (1977)	Lecturing vs. Questioning-response vs. Questioning-response-feedback	Development of knowledge and application, and total achievement.	Difference not significant.
		Development of comprehension	Significant differences.

sti- n	Process Variable(s)	Product Variable(s)	Finding(s)
la)	Narrow questions with feedback vs. broad questions with feedback vs. broad questions without feedback.	Development and retention of knowledge.	Significant differences (Narrow questions with feedback produced higher scores).
		Development and retention of application ability.	Significant differences (Broad questions with feedback produced higher scores).
la)	Narrow questions vs. Narration, vs. open questions vs. Narrow questions with feedback.	Pupil achievement at knowledge level.	Significant differences (Narrow questions produced higher scores).
		Pupil achievement at comprehension level.	Significant differences (Narrow questions produced higher scores).
		Pupil achievement at application level.	Difference not significant
ann 3)	Lecturing without any question vs. Lecturing with rhetorical questioning.	Development of knowledge	Significant dufference (Lecturing with rhetorical questioning produced higher scores).

5.02 The findings of the studies on classroom questioning behaviour and pupil achievement reveal that the two are related in some aspects while not in others. Spaulding (1964) found positive significant relationship between the frequency of clarification questions and pupil achievement. Soar (1966) revealed positive relationship between frequency of eliciting answers to interpretation and generalisation questions and pupil achievement. Ryan (1974), Kesri (1974), Adams (1975), Marlino (1976), Tiedman (1977) indicate the tendency of positive relationship between classroom questions at different levels and pupil achievement of specific cognitive levels. Klierman (1969) reveals at higher level questions produce higher achievement in pupils with higher IQ. On the other hand, a number of studies (Solomon 1963, Perkins 1965, Harris 1966, Hans 1968, Tischer 1968, Allen 1969, Wright and Nathall 1970, Martibean 1974, Adams 1975) contridict these findings. Obviously, the trend of mixed findings continue throughout.

5.03 The set of studies involving not questions perse, but teaching patterns including questions have revealed that some patterns are likely to produce higher gains in pupil achievement at specific cognitive levels than other. Sharma (1972) found that at narrow questions produce higher pupil achievement at knowledge and comprehension level and not at application level. Lecturing with rehtorical questions produced higher pupil scores at knowledge level (Lilimon 1973). Shaida (1976) reveals that narrow questions with feedback produce higher pupil achievement at knowledge level and its retention. Padma (1976) reports that questioning-answering-feedback-problem-solving produced higher level of application ability of pupils and its retention. Chakrabarty (1978) found that lecturing-questioning-answering with behavioural objectives produced higher achievement at knowledge, comprehension and application levels. No results concerning the levels beyond application have been reported.

5.04 The results concerning process-product studies with classroom questioning behaviour as independent variables and pupil cognitive achievement as dependent variable show that research in this area is inadequate as well as confusing. Very little emerge from this research for the classroom practitioner. However, Kliensman (1964) points to the fact that only differentiated studies are likely to provide conclusive evidence. The pupil characteristics, the grade levels, the content characteristics, and other context variables need to be explored further to derive dependable findings. Secondly, it appears that research on classroom questions *per se* is not likely to yield conclusive results. What goes on in the classroom before and after questions is also important. Probably, research on classroom questions in the context of teaching behaviour patterns may produce more promising results than has been the case hitherto. Thirdly, designing and analysis of the studies research on process-product studies involving classroom questioning behaviour need improvement.

6.00 Conclusion

6.01 Research on classroom questioning behaviour has its roots in the beginning of the current century. Lot of studies have been conducted to find out the incidence in classroom, levels of classroom questions used, and pupil achievement they are likely to produce. Despite this, the coverage has not taken into account the entire repertoire of classroom questioning behaviour. For example, the purpose of asking the questions (promoting, seeking further information, focussing and refocussing, management of pupil attention) have not been adequately researched. The study of questions in the context of pupil response is still lacking. The effect of delivery and distribution on the comprehensibility of questions in the classroom and the nature of pupil response is yet another area needing an empirical probe. Besides, pupil characteristics like his intelligence, creativity, content mastery at the time of question entry having direct relevance do not appear to have received due focus in research in this area. The prospective studies on classroom questioning may attempt to break new grounds by way of venturing into the sets of variables ignored so far.

6.02 The results marshalled in the present review are based on correlational as well as experimental studies with a wide range of terms used for the independent variables. This has presented difficulties for not only reviewers but for the research worker interested in their replication as well. It is highly desirable that standard operational terms be used in future research to remeady this situation as only a cluster of replicable studies in a particular area can provide dependable knowledge. Simultaineously, sturdier design and analysis procedures be adopted for achieving this end.

6.03 Considering the status of research in the area of classroom questioning, one can conclude that despite lot of interest in the area, research is inadequate in terms of coverage of variables. Whatever research is available does not provide conclusive results which can provide guidelines to the classroom practitioners and teacher educators. However, there is no room for pessimism. The new genre of research in the area of classroom questioning in this review and others (Rosenshine 1978 and Winne 1979) is likely to fulfil the gaps in near future.

Aagard, S.A., Oral Questioning by the Teacher: Influence on student achievement in eleventh grade chemistry (Doctoral dissertation, New York University, 1973). *Dissertation Abstracts International*, 1973, 34. 631-A (University Microfilms No.19406).

In the study students of class 11 were taught by Fourteen teachers. Teachers were oriented in the workshop and they were provided with the scripted lesson plans with itemized contents, its sequence and verbative phrasing of questions to be asked in the 11 lesson units on Radioactivity. Each teacher was observed once or twice during the instruction by the researcher. There were statistically significant effects attributable to levels of the Treatment for all but the pretest scores (p.05 at least). The means of the posttest and gain scores with the knowledge questions group scored lowest, the no-questions group in the middle and the higher cognitive questions group scored highest. Statistical comparison of the ammount of variation (R^2) absorbed by each model showed that IQ contributed significantly to variation in gains. Higher cognitive question group outperfored the other groups at (p.01) level.

2. Abraham, P.P. "Effectiveness of Microteaching in the development of the skill of the questioning "Unpublished M.Ed. Dissertation, M.S. University of Baroda, 1974.

The study attempted to find out the relative effectiveness of microteaching and traditional student teaching approach to master the two skills in questioning.

The study revealed that microteaching approach is effective in the devclopment of skills of probing questioning and fluency in questioning.

3. Admas, T.H. "The Deelopment of a method for analysis of questions asked by teachers in classroom Discussion" Doctoral dissertation, New Brumswick New Jersey: Rutgers, the State University, 1964.

The study indicates that memory questions are unduly emphasised by teachers in the classroom, and social studies high school teachers used them more frequently than the high school English teachers. A significant finding was that the high school teachers tended to ask more memory questions than did junior high school teachers.

4. Adams, M.F."An examination of the relationship between teacher's use of higher level cognitive questions and the development of critical thinking in intermediate elementary students" Dissertation Abstracts International Vol.35(9-A).5978, March 1975.

This is a two group experimental study with students selected from intermediate classes. The two groups were compared for m an gain scores of critical thinking after an experimental treatment of teaching with higher level cognitive questions. Sequential tests of Educational Progress were used of measuring the gain in critical thinking over the period of treatment. No significant difference was found between the two groups. However, the study revealed a significant relationship between the cognitive level of teachers' questions and students' responses. This relationship was found to be stronger in those classes where teachers used higher cognitive level questions than in classes where lower questions were used.

5. Allen G.J. "The relationship between certain aspects of teacher's verbal behaviour and number development of their pupils". Unpublished doctoral dissertation, University of Melbourne, Australia, 1969.

The study observed 18 first grade mathematics teachers in relation to their teaching behaviours. The pupils' number development was measured after one year. It has been found that there exists a nonsignificant relationship between teachers' substantive interchanges classified as translation, interpretation or application and pupils achievement on a test of number development.

6. Amudsen, A.R. "An investigation to determine the effects of questioning in science on questioning skills and related abilities" Dissertation Abstracts International Vol. 34 (5-A), 2411, 1973.

The study attempted to determine whether students pertinent questioning skills and their ability to make connection between given information and other verbal information (implication) would be improved more by teacher-initiated or student-initiated data collecting questions. The instruments used were related to the cognition and divergent production of semantic implication cells of Guilford's Structure of Intellect model. The sample is taken from V111 & IXth grade pupils. The results indicate that both treatments (Teacher initiated questions and student initiated questions) improved the skills of pertinent questioning and perceiving problems. The study concluded that student activity oriented instruction is not superior to instruction in which pupil is more passive for developing cognitive skills and content achievement.

7. Aschner, M.J.M. "Asking questions to trigger thinking" NEA Journal, 50 (6), 44-46, 1961.

This is a general paper which emphasises the role of questions in developing the thinking abilities of students. The paper classifies questions in the four types viz. memory question. Questions that prompt reasoning, Questions calling for judgement and questions that launch creative thinking. Aschner equates the teacher to a "professional question maker" and described questioning as 'helping minds to grow'.

8. Aschner, M.J. *et al*, "A system for classifying thought processes in the context of classroom verbal interaction "University of illinis, Urbana, 1962.

Classroom verbal interaction entails certain mental processes going on in teachers and pupils brains at certain levels of thoughts. Aschner, M.J. et al. propose a system for classifying these thought processes in this paper. The same level are used for questions as well.

9. Awshutz, R. "An investigation of wait time and questioning techniques as instructional variable for science method students using microteaching" *Elementary School Children*, DAI, 35(9), 1975.

10. Baden, D.J. "The effect of probing questions within a value conflict and a standard social studies content on the critical thinking skills of primary age children". *Dissertation Abstracts International*, 34, (8-A, Pl-1), 4942, 1974.

The study attempted to determine the (a) effect of probing questions on third graders' critical thinking skills.(b) effect of a value conflict content on critical thinking skills of 3rd graders; and (c) effects of the interaction of teachers' use of probing questions within a value conflict content on critical thinking skills. Sample consisted of 1,233 students randomly assigned to two groups, one of which was treated with a value conflict content and the other with a standard social studies material. The treatment lasted for 2 weeks after which a post-test was administered. The study concluded that high use of probing questions stimulates critical thinking in third graders. However, it was also revealed that probing questions are not used by the teachers in classroom in the amount they ought to be.

11. Bartolome,P"Teachers" objectives and questioning in primary reading" The Reading Teacher. 23 (1). 27-33. 1969.

The questioning behaviour of the teachers of primary reading classes was observed by the author It was found that recall questions are more utilised in usual classrooms. It has been suggested by the author that better teacher training technique should be utilised to improve the questioning behaviour of teachers.

12. Bedwell,L.E. The Effects of training teachers in question-asking skills on the achievement and attitudes of Elementary pupils, (Doctoral dissertation Indian Uni; 1974). Dissertation abstracts international, 1975, 35, 5030-A, (University, Microfilms No.5543)

In the experimental study, two groups of students were taken for the experiment, applying all the six levels of Bloom's Taxonomy. First group of students received 400 of application, analysis, Synthesis and evaluation questions, the second group receiving knowledge level and comprehension level questions. Results of the study were significant at p.10 for all three achievement tests was a main effect of grade (p.5) on the grade 4-5 level achievement test-when the achievement tests items from all the three tests were regrouped to form a fact questions scale and a higher cognitive questions scale. Similar analysis also showed significant effect for grade (p.5) on the later measure.

13. Beseda, C.G., Levels of questioning used by student teachers and its effect on pupil achievement and critical thinking ability. (Doctoral dissertation, North Texas State Uni: 1972). Dissertation Abstracts International, 1973, 33.4214 A. (University Microfilms No.73-2889).

In this study sixteen inter-teacher experimented on the two groups of students. One group was the treatment group which received the feedback from their supervisors and the second group being the control group, not receiving any feedback, but on the contrary their performance was recorded by the supervisors. For conducting the study the author gathered the obsecrvational data on the use of teachers questions while teaching. Significant readdition was found between the training condition and the use of more divergent questions relative to convergent questions over the eight week period (p. 01).

14. Blank, M. & Soloman, F.E. "The child like question: Its value in teaching" *Journal of Learning Dissabilities*. 9(10). 625-632, 1976.

The paper presents a set of three principles, which according to the author, are important in teachers encounter with pupils in the classroom. The author emphasizes the value of childrens' questions from the point that they help teachers in gaining understanding of the mental processes going on in pupils mind. The author also notes the specific qualities to be incorporated in a question.

15. Boller, D.H. "The effects of inquiry activities on the questioning strategies of third and fifth grade students" "*Child Study Journal*." 3(4), 203-212, 1973.

In the study 8 third and 8 fourth grade student were randomly selected and assigned to control and experimental groups. The experimental group participated in activity sessions of half hour for six days. These sessions involved pupils in problem solving and asking questions for searching the solution. The post-test examined the questioning strategies of both 3rd and 4th graders. It was found that experimental group and control group differ significantly on the post-test criterian measures. However, no difference accross the grades existed between the subgroups i.e. experimental grade 3 vs. experimental grade 4; control grade 3 vs. control grade 4.

16. Rober, J.R. Immediate and delayed retention effects of interspersing questions in written instructional passage "*Journal of Educational Psychology*, 66 (1) 96-98.

The study investigated the short and long term retention effects of interspersing factual questions in written instructional passage. The experimental group (under graduate students) received the written passage with questions inserted in the text. A post-test revealed that experimental and control group differed significantly in immediate and seven day delayed retention measures.

17. Borg, W.R., Kelly M.L., Langer, P., and Gall, M. "The minicourse: A microteaching approach to teacher education". Beverly Hills, Calif: Macmillan Educational Service, 1970.

18. Bortx, E.L. "Electronic recording media, microteaching self critique and questioning behaviour of student teachers" Doctoral dissertation, University of Maryland, U.S.A., 1971.

(18.1) Borg, W.R. "The minicourse as a vehicl for changing teacher behaviour-the research evidence"

(18.2) Borg, W.R. et al. "The minicourse rational and uses in the inservice educations of teachers".

(18.3) Minicourse: one; "Effective questioning in a classroom discussion: Teachers' Handbook published by the FarWest Laboratory for Educational Research and Development, Berkely, Calif, 1968.

(18.4) Minicourse: one; "Effective questioning in a classroom discussion: co-ordination Handbook published by the Farwest Laboratory for Educational Research and Development, Berkley, Calif, 1968.

(18.5) Minicourse: one; "Effective questioning in a classroom discussion: Evaluation forms published by the FWL, Berkley, Calif, 1968.

The minicourse is a programme developed at far West Laboratory for training inservice teachers in better questioning practices. The course follows self instructional approach based on modelling, self feedback and microteaching. It takes about 15 hours to complete. Research findings have consistently proved the effectiveness of the minicourse as a means for improving questioning behaviour of teacher.

19. Bramner, B.D. "An investigation of the inquiry questioning strategies used by secondary social studies teachers" Dissertation Abstracts International, 34 (9), 5770, 1974.

The classroom questioning behaviour of secondary school social study teachers was observed in the study which revealed that approximately 90% of the total teacher questions were at recall level requiring statement of already learned information. A high use of leading question was also observed.

20. Brown, G. *Microteaching : A programme of teaching, skills* Metheren Co. Ltd., 1975. Unit 'Questioning and Answering' pp-103-118.

Brown has described the components of effective questioning for improving teaching effectiveness through microteaching. Various aspects of questioning behaviour such as fluency, clarity and coherence, pausing, pacing, directing and distributing are operationally defined.

21. Buch, M.B. & Santhanam, M.R. "The classroom verbal behaviour of selected teachers in Baroda Secondary Schools" in M.B. Buch & M.R. Santhanam. (Eds.)

"*Communication in classroom*" CASE, Baroda, M.S. University Press, 1970.

The study reported 1251 tallies in category '4' asks questions (FIACS) out of the total tallies of 14786 in different categories, which is about 8.46% of the total tallies. The study is based on observation of teaching following FIACS.

22. Buch, M.B. & Quraishi, Z.M. "The influence patterns of male social studies teachers as determined by Flanders Interaction Analysis Category System". In M.B. Buch & M.R. Santhanam (Eds) *Communication in classroom* CASE M.S. University of Baroda, Press, 1970.

This investigation studied the influence pattern of male social studies teachers as determined by FIACS. It reported 1580 tallies in category '4' (asks question FIACS) out of the total tallies of 19135. This was about 8.25% of the total tallies.

23. Buch, M.B. "Interaction patterns in Indian Classroom" in M.B. Buch (Ed) "*Studies in Teacher Behaviour*". M.S. University of Baroda Press, 1975.

This was a study conducted under the Co-operative Project on Productive Teaching, (COPPT). The sample consisted of 500 classrooms in nine states and union territories of India. The TQR was found to be 16.32, which is lower than that of an American Teacher (26.00).

24. Berggey, L.J. "A study of the relationship & classroom questions and social studies achievement of second-grade children. (doctoral dissertation, uni, of Weshington, 1971). Dissertation Abstracts International, 1972, 32, 2543-A. (Uni, Microfilms No.71-28385).

Study was carried out on 108 studentsby the three doctoral candidates, by preparing specially 8 lessons unit, which was taught to the students in consecutive three week intervals. The lesson plans defined two questioning treatments, 70% of higher cognitive and 30% of knowledge questions vs. 30% of higher cognitive and 70% knowlddge questions. Group of students wereexchanged after the teaching of first unit so as to be taught by the different teacher. At the end of the study marginally statistically significant differenceby location, and sex by location interactions (p.10) were noted.

25. Chasas, S.V.M. "Teacher-student verbal interaction and critical thinking ability in introductory college biology" Dissertation Abstracts International, 34(2-A), 660, 1973.

The study did not find any significant relationship between teaching methods (lecture, discussion using broad question and discussion using narrow questions) and the development of critical thinking ability of the students.

26. Chakraborty, M "An inquiry into the strategies of classroom teaching", Doctoral dissertation, M.S. University, Baroda, 1978.

The study compared three teaching strategies for the pupils achievement at different cognitive levels. The strategy one (S_1) envisaged lecturing and questioning answering, strategy two (S_2) lecturing and questioning answering by using behavioural objectives, and strategy three (S_3) discussion by using instructional material. The population consisted of 150 IX grade geography students. The results indicated that S_2 was effective than S_1 for knowledge, comprehension application and total achievement of post-test level; and for knowledge , application and total achievement at retention level. S_2 was found to be effective over S_3 for knowledge, application, comprehension and total achievement at both post-test and retention level. S_3 was more effective than S_1 for application at post-test level and for knowledge, comprehension, application and total achievement at retention level. Further both S_2 and S_3 were found to be more effective than S_1.

27. Chaudhri, U.S. "Questioning for creative thinking: A research perspective". *Journal of Creative Behaviour*. 9 (1) 30-34, 1973.

The author emphasizes the role of questions in the development of creative abilities of students and quotes Hunt (1961) as stating " Questions are probably the best means of imposing cognitive strain on learner so that he tries to invent system for handling the data more efficiently.

28. Church, J. "An experimental study of differing teaching techniques in the teaching of a science topic at the standard four level. Unpublished manuscript, uni, of canterbury, Newzealand', 1970.

In the skill study, students were taught by the experimenters using highly scripted lessons. The experimenter used different teaching treatments. In the first treatment 70% of 35 % (38 of 109) divergent questions, in the second treatment 65% of divergent questions (111 of 171) as primary questions in 110 minutes of instruction and in the third treatment 65% of divergent questions (71% of 109) in lessons of 66 minutes teaching duration. No significant result was noted after the teaching of lessons.

29. Chaudhari, U.S. "The role of questions in thinking and learning from text: A research perspective" _Educational Technology_ 14(1), 1974.

This paper presents a brief history of questioning with reference to Greek Philosophy, current educational methods and cognitive theory in psychology. The author states that the research work in classroom questioning behaviour, text-book questions is essential to understand and develop suitable training techniques. The paper also explain the causes underlying the relationship between questioning and various pupil outcomes.

30. Clause, K.E. "Effect of modelling and feedback treatments on the development of teachers questioning skills". Technical report No.6 stanford Centre for Research and Development in Teaching. School of Education, Stanford University (Memiographed).

31. Clause, K.E. et. al. "Aptitude treatment interaction in teacher acquisition of higher order questioning skills" in W.Filder (ed). _Abstract one_, Annual meeting of American Educational Research Association, 1970.

32. Conners, C.K. & Eisenberg, L. "The effect of teacher behaviour on verbal intelligence in operation Head start children" Baltimore: Johns Hopkins University School of Medicine (US Office of Economic Opportunity Headstart Contract No.510) ERIC ED: 010782, 1966.

The study investigated the relationship between teaching behaviour of 38 preschool teachers and the pupil achievement. The observation period lasted for six weeks. The investigators observed 'episodes' occuring in the classroom. It revealed that teachers focus on 'intellectual growth' and focus on 'property and materials' are significantly related to pupil achievement.

33. Corey, S. "The teachers out-talk the pupils" School Review, 48 (9), 745-52, 1940.

The study found that one question per 72 seconds was asked by teachers and 54% of these questions require factual answers. Only 21% questions required thoughtful answers from pupils.

34. Crump, G. "Self insturction, in the art of questioning" Unpublished booklet, Indiana University, 1969. 56 frames.

The booklet contains programmed material to provide basic understanding levels of questioning. It is highly useful for pre-service and in-service teachers.

35. Cunningham, R.T. "A descriptive study determining the effects of a method of instruction designed to improve the question phrasing practices of prospective elementary teachers" Unpublished doctoral dissertation. Indian University, 1968.

This is an investigation into a method of instruction using vedio taped classroom lessons for the analysis of classroom questioning behaviour of teachers.

36. Cunningham, R.T. "Developing question asking skills" in Wiegand, J.E. (ed.) Developing Teacher Competence Practice Hall, Inc, Englewood Cliffs, New Jercy, pp-107-M9, 1971.

The author has defined various aspects of classroom questioning behaviour in operational terms and outlined guidelines for teachers to improve their questioning practices. According to the author 'Yes' or 'No' type of questions should not be used in classroom in large numbers. Similarly, 'ambiguous questions', spoon feeding questions and confusing questions should also be avioded. It also provides material for structuring questions at different levels.

37. D. Amico, M.L. "Effects of interspersed questions, imagery instructions and feedback on acquisition and retention of written counselor material" Dissertation Abstracts International, 37 (4-A), 1983, 1976.

In the study students received 21 pages of written material in four ways. The first group received the material with interspersed questions, the second interspersed questions with feedback, the third, imagery instruction and the fourth, imagery instructions with feedback. Significant differences were observed on the criterion tests accross various treatments.

38. Davis, O. & Tinsley, D. "Cognitive objectives revealed by classroom questions asked by social studies student teachers". _Peabody Journal of Education_, 45.1, 21-6, 1967.

The study was based on the observation of 44 secondary student teachers, 32 of these teachrs taught senior high schools and the remaining 12 teachers taught in junior high schools. A teacher-pupil question inventory developed by the authors, was used for this purpose. The results indicates that most of the teacher and pupil questions asked in the classroom belong to the memory category. The next largest number of questions fell in to the interpretation and translation categories. Higher categories are less frequent in the classroom. The study also found that junior high school student teachers askd more questions then did senior high school teacher in the categories of translation, evaluation and procedure.

39. Dobl, N.R. "Pupil questioning behaviour in the context of classroom interaction". _Dissertation Abstracts International_. 26. 644-52, 1966.

The study focussed on pupils' questioning behaviour in the classroom and found that the likelihood of asking thought provoking question by the pupil is extremely low.

40. Dowaliby, F.J. "Adjunct questions in the classroom Dissertation Abstracts International. 34 (8-B), 1974.

41. Ebert, M.T. "The effects of modelling and feedback on the learning of questioning behaviours by teacher candidates in nursing utilising microteaching practice setting". Unpublished Doctoral Dissertation, University of California, 1970.

42. Elsberry, R.V. "A comparison of the achievement of high school pupils using an over answering method versus a covert answering method when studying programmed materials involving the graphical addition and substraction of vectors" Dissertation Abstracts International, 36(3-A), 1377-1378, 1975.

This is a study of six classes of high school algebra pupils consisting of 148 students and one class of elementary methematical analysis consisting of 16 students. These pupils were divided into two groups - one group answered the programme overtly and the other covertly. The analysis of data revealed a significant difference in the achievement of both groups.

43. Farley, G.T., and Clegg, A.A. "Increasing the cognitive level of classroom questions in social studies : An application of Bloom's taxonomy". Paper presented at annual convention of American Research Association, Los Angles, 1969.

The paper states that classroom questions in social studies are mostly of recall type and has seldom went beyond the interpretation level of Bloom and Sander's taxonomy.

44. Floyd, W.D. "An analysis of the oral questioning activity in selected colarado primary classroom Doctoral dissertation; Greeley, Co. : Colarado State College, 1960.

The investigation focussed on questioning in first, second and third grades. It found that the ratio of teacher-questions to pupil questions reaches as high as 95 to 5. Another important finding was that pupil questions were 3.75% , 5.14% and 3.64% of the total number of questions in the samples of first, second and third grades respectively.

45. Friedman, M. "Teacher's cognitive emphasis and pupil achievement" *Education Research Quarterly*, 2, (1) 42-47, 1977.

This experimental study used modified version of Bloom's taxonomy and an objective test to measure pupil achievement in geometry. Two classroom situations for each teacher were observed. The study revealed significant difference between teacher emphasis of the memory and application levels and pupil achievement at these levels.

46. Furst, N.F. "The multiple Languages of the classroom" paper presented to the American Educational Research Association. Also available as an unpublished doctoral dissertation, Philadephia, Temple University, 1967.

The data on teacher-student subtantive interactions are analysed in this study. Student achievement is seen as a function of structuring and questioning exhibited by the teacher in the classroom.

47. Gall, M.D. "The use of questions in teaching" *Review* of Educational Research, 40, 5, 707-21, 1970.

The paper reviews a number of studies undertaken in the area of classroom questioning behaviour of teachers. Various question classification systems are discussed alongwith suggestions for further research in the area.

48. Gall, M.D. Ward, B.A; Berliner, D.C; Cahen, L.S; Winne, P.H; Elashoff, J.D; & Stanton, G.C. "Effects of questioning techniques and recitation on student learning. American Educational Research Journal, 1978, 15, 175-199.

Two studies on teacher question effects were reported by this team of researchers, examining the students achievement as a function of the percentage of higher cognitive vs. fact questions. Semiprogrammed scripts were used to insure equivalance in the sequencing of content, phrasing of questions and provision of initial questions regardless of treatment. The experimental design was a 4 x 4 latin sequares. The vocabulary sub-scale of comprehension test of Basic Skills was also used to measure the intellectual ability of the students. Planned comparisons on measures of higher cognitive achievement (oral, essay and transfer of sub-scales of content and logical extension) showed a different pattern. For the oral logical extension scale, 25% of higher cognitive question group out-performed the 75% group (p.05) and the 50% group (p.07). On the essay and transfer content scales and the essay logical extension scales, the trend was in favour of 50% of group over the others. Statistical comparisons favoured 50% of group only on the essay content scale (p.05 for 25% group; p.10 for 75% of group).

49. Gallagher, J. "Expressive thought by gifted children in the classroom" *Elementary English*, 42, 5, 559-68, 1965.

The study revealed that the largest percentage of teachers' questions fall in the recall category (50%) and only 20% questions demand evaluative answers. The author discusses the various implications of this situation and states that higher order divergent questions are helpful in devloping creative potential among pupils.

50. Galloway, C.G. and Mikkelson, N.I. "Improving teachers' questions" *Elementary School Journal* 74, 3, 145-148, 1973.

The study experimentally proved that high percentage of memory level questions can be decreased through training student teachers in various questioning processes particularly in accordance with the taxonomy of educational objectives. It was found that student teachers used a high percentage of 'higher' cognitive questions involving cognitive functioning e.g. analysis synthesis and evaluation after the experimental instruction.

51. Gatto, F.M. "Pupils questions their nature and relationship to the study process" Doctoral dissertation, Pittsburgh, Pennsylvania: University of Pittsburgh, 1928.

52. Ghee, H.J., A study of the effects of high level cognitive questions on the levels of response and critical thinking abilities in students of two social problem classes. (Doctoral dissertation University of Virginia, 1975). *Dissertation Abstracts International*, 1976, 36, 5187-A. (University Microfilms No.76-1090).

In the experimental study students of two high school social problems classes were taught by the same teacher in the similar way but not equivalent, for six weeks. In one of the classes the teacher used predominently higher cognitive questions then the other class. Students achievement was judged by their responses to one question at each of the six levels of Blooms taxonomy. The responses were noted for the over all cognitive level. The Cornell Critical Thinking Test (Ennis + Millman 1971) was also administered before and after the unit. The study shows that higher cognitive questions tended to receive activities which stressed higher cognitive processes.

53. Goel, S. "Behaviour flow patterns of extrovert and introvert teachers in classroom at secondary level". Doctoral dissertation, Meerut University, 1978.

The study attempted to observe the behaviour flow patterns of introvert and extrovert teachers. Stratified purposive sample of teachers was taken for this purpose. The study revealed that extrovert teachers usually ask more questions in the classroom and show a tendency to break off the 'silence' or 'confusion' in the classroom through questioning.

54. Guszak, F.J. "Teacher questioning and reading" The Reading Teacher, 21, 227-234, 1967.

The study revealed that 42% of teacher questions are of the recall type.

55. Guszak, F.J. "Questioning strategies of elementary teachers in relation to comprehension". Paper presented at the International Reading Conference, Boston, Mass, 1968.

The author conducted a study at primary level and found that recall questions were asked more than half of the time (57%) by teachers in grades of 2, 4 & 6.

56. Hall, J.W. and Hall, A.C. "The question as a factor in teaching" Boston : Houghton Mifflin Company, 189 pp, 1916.

57. Halstead, J.B. "Reading comprehension requirements for different instructional objectives : The effects of post adjunct questions and orienting directions" *Dissertation Abstracts International*, 37, (1-A), 244-245, 1976.

The study aimed at determining the facilitating effects of orienting directions and post adjunct questions on the learning of intentional and incidental facts by the students. The sample consisted of 105 VIIth graders randomly assigned to four treatment groups receiving different versions of the instructional material. The study revealed that both orienting directions and post adjunct questions failed to facilitate the mastery of facts, concepts and rules among low comprehension readers.

58. Hansen, E. "A comparison of the teaching behaviours of highly creative and creative basic business teachers" Unpublished doctoral dissertation, University of Minnestta, 1965.

59. Hargie, O.D.W. "The importance of teacher questions in the classroom". Educational Research Vol.20, No.2.

The paper presents a review of researches carried out on questioning behaviour of teachers. Various types of studies are discussed by the author and significant conclusions are derived for future research.

60. Harris, A.J. and Serwer, B. "Comparison of reading approaches in first grade teaching with disadvantaged children" (The CRAFF Project - 1) New York University of New York (U.S. Office of Education Co-operative Project No.2677) 1966.

The study revealed nonsignificant difference between pupil achievement in relation to the frequency of high and low order questions in 1st grade reading classes. This study used the observation system developed by Medley & Smith.

61. Harris, A.J.; Morrison, C; Serwer, B.L. and Gold, L. "A continuation of the craft project : comparing reading approaches with disadvantaged urban Negro children in primary grades". New York : Division of Teacher Education of the City University of New York (U.S. Office of Education Co-operative project No.5-05-70-2-12-1), 1968.

It was found that the levels of teachers questions do not affect pupil achievement in reading of second grade pupils.

62. Haynes, H.C. "The relation of teacher intelligence, teacher experience and types of school to type of questions" Doctoral dissertation. George Peabody College for Teachers, 1935.

The study found that 77% of the teacher questions in VIth grade history classes called for factual answers and only 17% were judged to require students to think.

63. Houston, V.M. "Improving the quality of classroom questions and questioning" *Educational Administration and Supervision* 24, 17-28, 1938.

The study developed an inservice education programme to improve the classroom questioning behaviour of teachers. Different techniques adopted refer to group conferences, stenographic records, self analysis and supervisory evaluation. A pre-test/postest indicated significant gains.

64. Huenecks, D. "Cognitive levels of teacher objectives and oral classroom questions for curriculum guide users and non users" *Educational Leadership* (Research supplement), 3, 3, 379-84, 1970.

The study attempted to explore the difference between curriculum guide users and nonusers in relation to their classroom teaching behaviour. The observation tool was based on Bloom's taxonomy of educational objectives. Nonsignificant difference between the frequency of questions asked at different levels by users and nonusers was found.

65. Hunkins, F.F. "The effect of analysis and evaluation questions on various levels of achievement" Paper presented at the annual meeting of the American Educational Research Associations, Chicago, 1968.

The study employed two groups one of which was treated with knowledge questions (a), and the other with analysis and evaluation questions (b), The post treatment test measured the pupils' achievement in six areas of Bloom's taxonomy. The group (a) scored significantly higher on subtest for application and evaluation. In rest of the four areas no significant difference was found between the two groups.

66. Hunkins, F.F. "The influence of analysis and evaluation questions on achievement in sixth grade social studies" *Educational Leadership*, 1, 1, 2-7, 1968.

The study revealed that higher questions (analysis and evaluation) produce significantly higher achievement among the sixth grade social study students than the lower questions (knowledge). It was also shown that better readers achieve higher in both conditions.

67. Hunkins, F.F. "Analysis and evaluation questions : Their effect upon critical thinking" *Educational Leadership*, 3. 5, 1970.

The study found that (a) analysis and evaluation questions do not affect 'inference' significantly, (b) analysis and evaluation questions produced significantly more 'caution' among girls, and (c) the analysis and evaluation questions significantly affect 'discrimination' among pupils. The sample of this study consisted of 260 XIth class students.

68. Hunter, E. Encounter in the classroom - New ways of teaching Holt, Rinehart and Winston, INC. New York, 1972.

This book summarises research findings in the area of classroom teaching behaviours and draws implications for classroom practices. It contains a section on classroom questioning.

69. Jangira, N.K. Teacher Training & Teacher Effectiveness National Publishing House, Delhi, 1979.

The report on experiment in teacher behaviour including classroom questions indicates the trainaulity and transferability of the teaching behaviour.

70. Jangira, N.K. The effect of classroom behaviour training on classroom interaction pattern of student teachers and pupil adjustment. Indian Educational Review. 9, 2, 62-94, 1974.

A significant ratio (P .05) was found between TQR means of control and experimental groups immediately after the classroom behaviour training. This significant difference in TQR was present even after two weeks and seventeen weeks.

71. Jangira, N.K., Dhoendiyal, N.C. "Effect of classroom Behaviour Training (CBT) on classroom questioning Behaviour of Teachers (Experimental Treatment Material)". ERIC Project, Department of Teacher Education, NCERT, New Delhi-1980 (Memiographed).

This is a handbook based on the self instructional approach. It outlines the various functions, level and structures of classroom questions. The components of the questioning skills of structuring, delivery, distribution, pupil response management have been precisely defined and adequately illustrated. The material with practice even in stimulated situation help in mastery of the questioning skills.

72. Jangira, N.K. (In Press). *Technology of Classroom Questioning*.

The publication deals with different aspects of classroom questioning-structuring, delivery, distribution, management of pupil responses, training procedure using stimulation and microteaching. The material is useful for teachers, teacher educators and student-teachers for acquiring mastery in classroom questioning.

73. Johns, V.G. "Oral questioning practices of teachers in social studies classes" Educational Leadership, pp, 61-67, (Oct., 1970).

The study found that a high percentage (54%) of teachers questions are memory questions and higher levels beyond interpretation are mostly neglected. Further elementary school teachers ask more questions than the secondary school teachers.

74. Kaul, U. "An inquiry into the questioning behaviour of teachers of social science and social studies in the upper primary and secondary schools of Baroda "Unpublished M.Ed. dissertation M.S. University, Baroda, 1975.

The study found that most of the time both direct and indirect science and humanities teachers were devoted to lower order memory questions. Further, the time devoted to higher order questions by indirect teachers was more than the time devoted by direct teachers.

75. Kesri, S. "An experimental study into the effects of narrow and broad questions on achievement in social studies in terms of knowledge comprehension and application" Unpublished M.Ed. dissertation, Kurukshetra University, 1974.

In this study the pupils of social study classes were taught with either narrow or broad questions. It was found that narrow questions helped to achieve significantly higher on knowledge test and broad questions significantly improved achievement on comprehension and application tests.

76. Kissock, C. MON. "A study to test the value of micro-teaching in the programme of video modelling instruction in the development of higher order question arising on the part of pre-service teachers" Doctoral dissertation, University of Minnesota, U.S.A. 1971.

77. Kleinman, G. "General science teachers' questions, pupil and teacher behaviour, and pupil understanding of science". Unpublished doctoral dissertation, University of Virginia, Charlottesville, 1964.

The author studied classroom questioning behaviour of 7th and 8th grade science teachers and found that among high ability pupils, the higher order questions produce a significant difference (t = 5.02) in achievement in comparison to low order questions.

78. Knapczyk, D.R., and Livingston, G. "The effects of prompting question asking upon on task behaviour and reading comprehension" Journal of Applied Behaviour Analysis, 7, 1, 115-121, 1974.

The study found that prompting is effective for initiating question asking, increased levels of reading comprehension and ontask behaviour among educable mentally retarded students.

79. Kobayashi, Y. "Effects of teacher's questions on the learning of prose material" Japanese Journal Educational Psychology 22, 2, 120-125, 1974.

The author studied the effects of the timing and frequency of questions, the amount of information included in the question, and the pupils knowledge of results on the pupils learning of prose material.

80. Komachiya, M. "On the training of oral summarisation of english reading material by the direct method" Japanese Journal of Educational Psychology, 22, 2, 91-99, 1974.

This study revealed that the method of questions and answers is most effective for the acquisition of oral communication skills.

81. Koran, J.J. "The relative effects of classroom instruction and subsequent observational learning on the acquisition of questioning behaviour by pre-service elementary science teachers" Science Education Centre, University of Texas, Austin, U.S.A., 1968.

82. Kumar, S. "An inquiry into the questioning behaviour of the social studies and humanities teachers in secondary schools" Teacher Education, 11, 1, 1976.

The study reveals that social studies and humanities teachers do not differ significantly with regard to the level of their classroom questions. Further, the study indicated that indirect teachers in both social studies and humanities use significantly more application and analysis questions than direct teachers.

83. Larson, C.S. "An analysis of classroom questioning strategies in elementary science. *Dissertation Abstracts International*, 34, (8-A, I + 1), 4569 4570, 1974.

This is a descriptive study of the various questioning strategies employed by fifth grade elementary science teachers. The study indicates that Vth grade science teachers do not basically differ from other elementary teachers with regard to their questioning behaviour. It was also found that science teachers (elementary) do not usually designate the student to answer a particular question.

84. Loughlin, R.L. "On questioning" *The Educational Forum*, 25, 4, 481-82, 1961.

The author emphasises questioning in the perspective of teaching and states that 'to question well is to teach well'. Classroom principles of questioning are elaborated to help teachers improve practice.

85. Lynch, Ames, Barger, Fraser, Hilleans Wischart, S. (Note 3, 1973) "Effects of teachers cognitive demand styles on pupil learning (Final Report 30.3) Bloomington Indiana. Centre for innovation in teaching the handicapped Indiana University, November, 1971.

The study was conducted by the research team for student teachers. Two studies were taken for the research. They were with-in design but different at the level of independent variables. Two groups of 36 student teachers participated in one hour meeting, receiving tests on multiple choice tests of the factual knowledge and concept mastery at the end of each lesson. The study form that the teachers instructed to teach for concept mastry asked significantly fewer knowledge questions and significantly more higher cognitive questions than those instructed to teach for factual recall. Also, students of the teachers who stressed concept mastry initiated fewer interchanges and participated less equally in the lesson than did students in the factually oriented lessons factors which intrude on the focus of this review.

86. Lucking, R. A. "A study of the effects of a hierarchically ordered questioning technique on adolescents' responses to short stories", (Doctoral Dissertation, University of Nebraksa, 1975) Dissertation Abstracts International, 1976, 36, 5185-A. (University of Microfilms No.76-2035).

In the experimental study students of grade 10 were taught by three teachers who specially received 20 hours of training centered around Sanders' (1966) text, and an adjacent category of the Bloom Taxonomy written and videotape group analysis exercises were employed. Students were administered the reading comprehension section of the Stanford Achievement Test and a scale to measure attitudes toward reading (Estates 1972) as pre-measures. The researchers used multivarial analysis of variance. Results were found to be significant at the level of comparison of phases one and three, phases two and three and two of the Serves Categories, (Interpretation and evaluation; i.e. p.05 for all three contracts).

87. Maclennan, D. "The effect of teacher question upon pupil attitudes and achievement; A study in the microteaching context". M.Sc. Thesis University of Sterling, 1976.

88. Maheshwari, V. "A study into the classroom verbal interaction pattern of effective and ineffective teachers" Doctoral dissertation, Meerut University, 1976.

Through observation of 100 effective and 100 ineffective teachers, study revealed that questions are used more by effective teachers.

89. Markle, G.C. "The effect of position and cognitive level of questions on learning from an activity - centered module" Dissertation Abstracts International, 35, (6-A), 5151, 1975.

99 students of elementary science methods were randomly divided into nine treatment groups. The activity centered module was identical for all the groups except for location and cognitive level of instructional questions encountered during the lesson. Significant differences were indicated between groups receiving instructional questions and no instructional questions with regard to immediate and delayed post tests. However, differences were not found to be significant between immediate and delayed post-test scores of various groups.

90. Marlino, A. "A comparison of the effectiveness of three levels of teacher questioning on the outcomes of instruction in a college biology course". Doctoral dissertation, New York, University, Dissertation Abstracts International, 37, (9-A), 5551, 1976.

The study reveals that a significant gain in the development of students' understanding of key biological concepts depends on the level of questioning used in the classroom.

91. Martin, R.F. "Selecting a random sample of questions in a contingency managed (PSI) course". Psychological Record, 27, 1, 349-350, 1977.

This paper described a procedure for selecting questions for repetition of criterion performance. Administrative and academic benefits are also elaborated in detail in the write up.

92. Martikean, A. "The levels of questioning and their effects upon students' performance above the knowledge level of Bloom's taxonomy of educational objectives" ERIC 1974, 9 (9), Ed 091248.

The study reports nonsignificant difference in performance on criterion tests above knowledge level between groups of students treated with different levels of questions.

93. Mathew, G. "Classroom behaviours of teachers and its relationship with their creativity and self-concept" Doctoral dissertation, M.S. University, Baroda, 1975.

A stratified random cluster sampling technique was employed to select 245 teaching situations in 35 schools from the 133 secondary schools of Baroda and Muvatupazha (Class 8th, 9th & 10th). The teacher behaviour was observed through FIACS. The findings reveal that (a) there is no relationship between creative teacher personality and various dimensions of teachers behaviour, (b) there is negative relationship between creative teaching process and divergent question ratio, and (c) the convergent TQR is 10.276 while the divergent TQR was 0.375.

94. Mehta, Y.M. "An inquiry into the relationship between teachers' classroom communication pattern and certain perceptual factors" Doctoral dissertation. M.S. University, Baroda, 1976.

The investigator observed 114 history teachers teaching in grades 8th, 9th & 10th through FIACS. The study found a significant relationship between qualification of teachers and TQR. Further, male and female teachers did not differ significantly regarding 1/d, I/D and TQR. The study also revealed that post graduate teachers differ significantly from graduate teachers on TQR. Teachers' instructional goal perception was not found to be related with TQR.

95. Michael, D. and Maccoby, N. "Factors influencing verbal learning from films under varying conditions of audience participation" *Journal of Experimental Psychology*, 45, 6, 411-18, 1953.

The study revealed that oral questions asked during a film show significantly improves learning in comparison to rather passive viewing of the film.

96. Millet, G.B. Comparison of four teacher training procedures in achieving teacher and pupil "Translation" behaviours in secondary school social studies, (Doctoral dissertation, Stanford uni: 1967) Dissertation Abstracts International, 1968, 27. 4514-A. (University Microfilms No.68-6442).

The experimental study was conducted by secondary social studies internationals over a sample of 34 students using a common reading passage to introduce the topic and administer a 12 item short-answer essay test (interrater agreement = .95; sphi-half coefficient = .82) to gauge student learning at the end of the single period of instruction. 11 students were in control group; 10 in lecture training group; 10 in video tape model group, and 8 in lecture plus video tape instruction group. Parametric analysis of variance showed that lecture plus video-tape training significantly increased the teacher translation behaviours beyond the other three training treatments, (p.05), and that the training of any kind increased the use of these behaviours over no training (p.10).

97. Olmo, B.M. "Focus on questioning" *Journal of Teacher Education*, 21, 4, 504-8, 1970.

The author describes a method used at the university of IOWA to draw social studies method students' focus on questioning. The first phase of the two phase approach focused on the teachers' questions and the second phase emphasised lesson planning to elicit questions from students. Results and implications are discussed elaborately.

98. Ondick, T.E. "The effects of diagnostic questionings, corrective feedback and instructional feedback in concept attainment" Dissertation Abstracts International, 35, (8-A), 5158, 1975.

Subjects in four groups viewed a video-tape. Group A was not given any further treatment. Group B, C & D were given diagnostic questions in written form. Group B was not given corrective feedback or instructional feedback. Group C was given a corrective feedback after 2 minutes by the instructor and Group D was given both corrective feedback and instructional feedback after 2 minutes. A post test was administered to measure the 'conception' perception and behaviour of concepts presented via video-tapes. The results rejected the mull hypothesis. Differences between A & B ; and A and D were significant (p.05). The study indicated that instructional use of diagnostic questioning, corrective feedback and instructional feedback facilitated concept attaiment.

99. Padma, M.S. "Teaching patterns and pupil attaiment" Doctoral dissertation, M.S. University, Baroda, 1976.

The study tested four teaching patterns in relation to pupils development of application ability in physics of grade 7 pupils. These patterns were:

P_1 lecturing problem solving approach pattern, P_2 (Questioning answering feedback - problem solving approach pattern) P_3 (Questioning answering feedback - problem solving approach pattern). P_4, (Lecturing - no problem solving approach pattern). It was found that P_1 P_2 P_3 and P_4 have equal effect on development of applicational ability both in surprise testing condition and planned testing condition. Further the pattern P_3 was found to produce significantly smaller mean retention of application ability in comparison to P_1 P_2 and P_4.

100. Pangotra, N.N. "A study of the effect of feedback from different sources on the classroom behaviour of student teachers using the technique of interaction analysis". Doctoral dissertation, M.S. University, Baroda, 1972.

Using a pre-test post-test experimental design, the study found that the experimental group asked more questions while guiding the content oriented part of the class discussion.

101. Pareek, U. and Rao, T.V. "The pattern of classroom influence behaviour of fifth grade teachers of Delhi" In Buch, M.B. and Santhanam, M.R. (Eds.) *Communication in Classroom* CASE, M.S. University, Baroda, 1970.

The study reported 7441 tallies in category '4' (asks questions-FIACS) out of a total tallies of 8408, which is 8.84% of the total verbal talk in the classroom constituting 16.16% of the total teacher talk.

102. Pareek, U. and Rao T.V. "Behaviour modification in teachers by feedback using interaction analysis" Indian Educational Review, 6, 2, 11-46, 1971.

The study found that on a post treatment observation the experimental group used significantly more questions (category - '4', asked questions, FIACS) in comparison to control group.

103. Passi, B.K. "Becoming better teacher : The micro-teaching approach". CASE, M.S. University, Baroda, 1976.

The author has explained various components of questioning skill alongwith appropriate examples. Model lesson plans are also given to help teachers in acquiring the questioning skills.

104. Pate, R.T. and Bremer, N. "Guiding Learning through skillful questioning" The Elementary School Journal, 67, 8, 417-22, 1967.

The author have described the responses of 190 elementary school teachers' in grade 1 through 6 to the question 'what are three important purposes of teachers questions?' In total 14 response categories were identified. The three important functions given by most of the teachers were 'means to check on effectiveness of teaching by checking on pupils' learning (64%), diagnosis of pupils' learning (54%) and (means to check pupils' recall of specific facts' (47%). The paper also describes elaborately the 'Question analysis - an observation tool developed by the authors'.

105. Perkins, H.V. "Classroom behaviour and underachievement" American Educational Research Journal, 21, 1, 12, 1965.

The investigator studied 5th grade general t teachers (N=27) and found significant relationship between content orientedness and thought-stimulating questions and student gain.

106. Philip, H. Winne, "Experiments relating Teachers use of Higher Cognitive Questions to student Achievement" Review of Educational Research, Vol.49, No.1, 1979.

This paper reviews 14 students of on teachers questioning behaviour and provides guidelines for future research. Hunkings (1972), Canningham 1971, Rosenshine (1971), Dunkin and Biddle (1974), Health and Nielson (1974), and Berliner (1976).

1?7. Polmer, M. and Barron, A. The Questions Children ask Macmillan, New York, 1964.

This book describes the nature of various questions which children ask at different stages of their development. The author emphasises the need to deal with children questions in appropriate manner, in order to avoid the development of incorrect notions among them.

108. Pritchard, F.F." A comparison of the effects of training in wait time and training in questioning on classroom questioning behaviour of pre-service teacher "Dissertation Abstracts International. 37, (6-A) 3566, 1976.

Through a interview and theoretical reasoning the investigator deducts that there can be two approaches to train teachers to broaden their range of questio questioning. Teachers can be trained to recognise and pose questions by categories, and secondly, they can be trained to use pause to control the rate of questioning. This study experimentally compaired these two approaches and found that the two approaches do not differ with regard to increased higher level questioning.

109. Prosser, G.V. "The role of active questions in learning and retention of prose material". Instructional Science. 2, 4, 451-476, 1974.

The investigator defined active questions' as those asked by students, and passive questions' as those presented to them for solution. The study revealed that low verbal ability students gained most from active questions and high verbal ability students from passive questions.

110. Resnick, L. "Teacher behaviour in an informal British infant school" *School Review*, 81, 1, 63-83, 1972.

This paper emphasises the need to undertake research projects in area of classroom questioning behaviour of teachers. It is stated that approximately ⅓ of all teachers, talk belongs to teacher questions. It is highly desirable to explore the underlying relationships between questioning and achievement, questioning and teacher variables.

111. Rickards, J.T. "Type of verbatim questions interspersed in text: A New look at the position effect" *Journal of Reading Behaviour*, 8, 1, 37-45, 1976.

The study experimentally investigated the effect of location of written question on the retention of information contained in a written passage.

112. Rogers, V.M. "Modifying questioning strategies of teachers" Journal of Teacher Education, 23, 58-62, 1972,

The study followed Bloom's taxonomy in modifying the questioning strategies of teachers. The post test results are significant.

113. Rogers, V.M., & Davis, O.L. (1970) "Varying the cognitive levels classroom questions: An Analysis of student teachers' questions and pupil achievement in elementary social studies". Paper presented at the annual meeting of the American Educational Research Association, Lexington.

In this experimental study 20 students teachers of fifth grade and their whole classrooms participated. The teachers planned a 4 day unit divided in lessons of 35-40 minutes using a 35 item multiple choice test with five questions at each of the seven cognitive levels identified by Sanders (1966) to the students in fifth lesson (total scale reliability was at .75). Equivalent analysis on data of the four days showed that the trained teachers asked significantly higher proportion of translation and interpretation questions (.05) for both. It was found statisfically significant for analysis.

114. Raka, S.D. "A comparative study of verbal teaching behaviour patterns of students achievement in terms of instructional objectives" Doctoral dissertation, M.S. University, Baroda, 1976.

The experimental study conducted with nine Vll class general science teachers found that training in the use of cognitive memory and convergent, divergent and evaluative questions do not lead to greater incidence of memory and convergent questions in comperision to the group which was not given this training. However, such training significantly affects incidence of divergent questions in the classroom. Further, the study found that the greater use of divergent and evaluative questions do not lead to higher achievement at knowledge level, though it significantly affect pupils achievement at understanding and application levels.

115. Rosenstine, B. *Teaching Behaviour and Student Achievement*, International Association for the Evaluation of Educational Achievement, IEA studies No.1, NFER slough 1971.

This is a comprehensive review of approximately 51 studies conducted all over the world in the area of teaching behaviours including questioning and pupil achievement. The author has discussed the findings of various studies to deduct classroom practices for teachers and to give guidelines for future research work.

116. Resenshine, B. "Recent research on teaching behaviour and student achievement" *Journal of Teacher* Education, 21, 1, 61-64, 1976.

The various studies undertaken in the area of teaching behaviour and student achievement during 1971-1976 are reviewed by the author in this paper.

117. RothRopt. E.Z. and Ballom, R. "Effect of interpersonal interaction of the instructional value of adjust questions in learning from written material" *Journal of Educational Psychology*. 61, 6, 417-22, 1970.

This study compared three approaches to learn material presented through slides. It was found that the oral question-answer approach is significantly more successful than the written questions and no question approach.

118. Rothropt, E.Z. "Variable adjust questions, schedules, interpersonal interaction and incidental learning from written material" Journal of Educational Psychology, 63, 2, 37-42, 1972.

The study revealed that questions asked orally were the effective as opposed to written questions or no questions.

119. RothRopt, E, and Bellington, M.J. "Indirect review and priming through questions" Journal of Educational Psychology, 66, 5, 669-679. 1974.

The study investigated the effect of indirect review and priming on retention of material among under-graduates and high school seniors. No priming effects were found. However, indirect review was found to influence the relations of topically related material.

120. Rave, M. "Science, silence and sanctions" Science and Children, 6, 6, 11-13, 1969.

This study indicated the effects of increasing the average wait time on the various questioning behaviours of teachers and pupils. It was found that increased wait time results in the more thought provoking questions from teachers longer responses from pupils and more student initiated questions.

121. Roy, S. "Classroom questioning and pupil achievement: An inquiry into the teaching styles" Doctoral dissertation, M.S. University Baroda, 1977.

The study compaired the effectiveness of the three styles of teaching viz., lecturing, questioning and response without feedback, and questioning-response feedback sequence. The sample consisted of 98 high school geography students. The study revealed that the three teaching styles do not differ significantly with regard to total achievement and achievement at knowledge and application levels. However, at comprehension level lecturing style differed significantly from the other two styles.

122. Ryan, F.L. "Differential effects of levels of questioning on student achievement. Journal of Experimental Education, 1973, 41, 63-67.

Experimental elementary social studies teachers taught fifth and sixth grade students with the help of highly scripted lesson plans, which specified content, style of delivery, verbatim phrasings and the sequence of questions, to be asked, and the guidelines to insure that the high level students responses were obtained for higher cognitive teacher questions.

The students were administered a 58 item fact level multiple choice test, and a 46 item higher cognitive level multiple choice test. Comparison between the two levels of questions groups were statistically not significant, although there was a consistant trend showing the order of the higher cognitive questions over the fact questions group over the place to group.

✓ 123. Ryan, F.L. "The effect on social studies achievement of multiple students responding to different levels of questioning" Journal of Experimental Education, 42, 4, 71-75, 1974.

The study found that among 5th and 6th graders, the level of questions asked in classroom affect their achievement in geography. The high question treatment group out performed the low questions treatment and non question treatment groups on post test measurements. The non-question treatment group achievement least mean scores among the three groups.

124. Badkar, M.J.P. "Modifications of the frequency of student initiated higher order questions through microteaching and a taken economy". Doctoral dissertation, University of Massachuch, U.S.A. 1971.

125. Sanders, M.M. "Classroom questions. What kinds Harper & Row New Yark. 1966.

The book describes various levels of classroom questions in detail. It is a very useful publication for teachers, teachers educators and researchers.

126. Sanders, J.R. "Retention effects of adjunct questions on written and oral discussion" *Journal of Educational Psychology*, 65, 2, 181-186, 1973.

The study investigated the effects of adjunct questions on retention in relation to mode of presentation, time of testing and abilities of students.

127. Santhanam, M.R., Qureishi, Z.M. and Lulla, T.I. "Patterns of influence in social studies teachers" in Buch, M.B., and Santhanam, M.R. (eds.) "*Communication in classroom*" CASE, M.S. University, Baroda, 1970.

The investigators studies the patterns of influence of social studies male and female teachers. They reported 2400 tallies for category '4' (ask questions-FIACS) out of a total of 22173 tallies in case of female teachers and 1580 tallies for category '4' (asks questions FIACS) out of a total of 19133 tallies in the case of male teachers, which was 10.82% and 8.25% respectively.

128. Santhanam, M.R. "Some strategies of effective teacher classroom behaviour" *Indian Journal of Psychology and Education*, 3, 2, 72-75, 1972.

The investigator compared two teaching strategies for their effeciency. These strategies were (a) short question-short answer to repeated student discussion and (b) short question short answer to openended interchange. Results suggested that a strategy of openended questions can facilitate the creative inquiry cycle.

129. Savege, T.V. "A study of the relationship of classroom questions and social studies achievement of fifth grade children (Doctoral dissertation, University of Washigton, 1972). Dissertation Abstracts International, 1972, 33, 2245-A. (University Microfilms No.72-28861).

This research study is the perfect replication of Buggeys study, conducted in 1971, with the little change regarding the taken sample. Buggey took the sample of 96 students of second grade, when Savege took the grade fifth, for his study. The 3 x 2 x 2 (treatments by sex by locations) analysis of variance on the sum of the two unit post test scores showed statistically significant effects for treatments and for sex (p.01). Girls out scored boys. Both the 70% and 30% higher cognitive groups out performed the control group (p.01), but there was no statistical significant difference between group means for the two questioning treatments, (both having means roughly 47).

130. Schreiber, J.E. "Teacher Question asking techniques in social studies" Doctoral dissertation, Ann, Arbor, Mich, University, microfilms No. 67-9099, 1967.

The investigator studied the question asking behaviour of teachers in detail. One of the findings of the study is that about 40% of teacher's questions belong to recall category.

131. Shackel, D.S. "Teachers unintentional cues to answering questions correctly" *perceptual and Motor Skills*, 44, (3p + 1) 766, 1977.

This is an experimental study with 362 students and 12 teachers. The teachers asked the questions via videotape. But the key words of these questions were erased from the anditory and visual channels of the videotape to make them meaningless. However, the study found that students used kinosic and paralanguage cues to answer these questions correctly.

132. Shaida, A.K. "Teaching patterns questioning and feedback and pupil attainment. Doctoral dissertation, M.S. University, Baroda, 1976.

The investigator compaired (a) the effects of four teaching patterns on VII class pupils attainment in social studies at knowledge comprehension and application level, and (b) the effects of four patterns on retention on these levels. The teaching patterns were (1) narrow questions with feedback

(P_1); (111) narrow questions with no feedback (P_2) (111) broad questions with feedback (P_3) and (iv) broad questions with no feedback (P_4) the findings revealed that P_1 was superior to P_2 which in turn was superior to P_2 and P4 in relation to the development of knowledge and its retention. The P_3 produced higher means score than P_1, P_2 and P_4 for application and its retention. However, P_3 failed to produce significantly higher mean total score than P_1, P_2 and P3.

132. Shashkala, Y.S. "A study of interpersonal relationship between teacher and students with a view to establishing socio-physchological correlates of teachers behaviour" Doctoral dissertation, Banaras Hindu University, 1978.

The investigator correlated various socio-physchological factors of 148 secondary school social studies teachers teaching 9th grade. The findings revealed a positive correlation between age and TQR and a negative correlation between anxiety and TQR. It was also found that socio-economic status and modernity are not related to any of the teaching behaviours. Further non-significant differences among teaching behaviour accross different organisational climate were found.

133. Sharma, S. "Relationship between patterns of teacher classroom behaviour and pupils attainment in terms of instructional objectives" Doctoral dissertation, M.S. University, Baroda, 1972.

The investigator compaired four teaching patterns with regard to pupils' attainment at knowledge, comprehension and application levels. These patterns were narration (P_1), open questions (P_2), narrow questions (P_3) and narrow questions with feedback. The findings revealed that P_3 results in significantly higher mean scores of total attainment, attainment at knowledge level, and attainment at comprehension level. At application level differences accross the four patterns were not found to be significant.

134. Sharma, K. "A comparison of effectiveness of two types of feedback on the acquisition of questioning skill through microteaching" Himachal Pradesh University, Simla (micrographed), 1975.

135. Shepardson, R. " An analysis of teacher questioning and response behaviours, and their influences on student participation during classroom discussions" Dissertation Abstracts International, 33, (9-A) 5016, 1973.

Using a classroom observation system with seven teacher questioning categories and sixteen response categories, the investigator found that in elementary classrooms the variance in the amount of student talk depended to a large extent on the teacher's questioning and response behaviours. The study also revealed that individual praise, probe for classification and probe for cause and effect are highly correlated with student oral participations.

136. Singh, S.K. "A study of the relationship between verbal interaction of teachers in classroom and attitudes towards teaching with special reference to B.Ed. student" Doctoral dissertation, Meerut University, 1975.

The investigator observed 500 B.Ed. students with Flanders interactions. Analysis system and correlated various teaching behaviour indices with attitudes towards teaching. It was found that attitude towards teaching is significantly related with TQR instantaneous response ratio and instantaneous question ratio.

137. Sloan, F. and Pate, R. "Teacher pupil interaction in two approaches to mathematics". The Elementary School Journal 67, 3, 161-167, 1966.

The study compared the teachers classroom questioning behaviour in teaching two types of mathematics curriculum. The first group of teachers taught 20 fourth grade classes the 'School Mathematics Study Curriculum' based on the procedure associated with inquiry, discovery and symbolic logic (GI).

The second group was taught the traditional curriculum to same number of fourth grade classes (G2). The study revealed that G1 used more recall questions than G2, while G2 used a higher number of comprehension and analysis questions. For other five categories of questions recognition, skill, demonstration, synthesis, opinion and attitudes, no significant differences were found between G1 and G2. I In both groups, the recall questions were used with the highest frequency.

138. Smith, B.O. and Meux, M.O. "A study of the logic of teaching urban 111, University of Illinois.

The study noted a high percentage of recall questions in the classrooms (asked 66% of the total teachers questions). The incidence of questions that require logical operation such as comparison drawing inference and explanation is very low accounting for only about 33% of teacher questions.

✓139. Soar, R.S. "An integrative approach to classroom learning" PHiladelphia. Temple university (Final report, public health service grant no.5-R 11 MH 01096 and National Institute of Mental Health grand no. 7-R 11-MH 02045) ERIC Ed-033479, 1966.

The study found that higher level questions are positively related to student gain. In the case of factual questions this relationship was not firm, though factual questions has positive loading on a factor which was significantly related to achevement.

140. Solemon, D. Bezdek, W.E. and Rosessbury, L. "Teaching styles and learning" chicago, Centre for the Study of Liberal Education for Adults (ERIC ED. 026556), 1963.

Through the analysis of tape-recordings of 24 college evening school teachers with a six category system, the investigator found that interpretation and factual questions are loaded on a factor which is significantly related to student gains in comprehension.

141. Spaulding, R.L. "Achievement, creativity and self-concept correlates of teachers-pupil transactions in elementary schools" Hempstead, New York: Hofstra University, (U.S. Office of Education Co-operative Research Project No. 1352) 1965.

The study revealed that the frequency of higher level questions is negatively related to student achievement in mathematics among the 4th and 6th grade pupils.

142. Stahl, R.J. "Realising value classification objectives through the use of a questioning strategy: An experimental study" *Southern Journal of Educational Research*, 11, 3, 119-113, 1977.

143. Stanford Program on Teaching Effectiveness. A factorially designed experiment on teacher structuring, soliciting, and reacting (R & D memorandum 147). Stanford California: Stanford Centre for Research and Development in teaching, November 1976).

For this experimental study four teachers were specially trained and prepared to teach students of grade sixth. The high solicit treatment consisted of 60% higher cognitive and 40% fact questions in each lesson, and in the low solicit teaching they used 15% higher cognitive and 85% fact questions in each lesson plus short post question wait time.

Units of analysis showed that the predominantaly fact questions treatment promoted greater learning as measured by both fact recall and higher cognitive test items. There is a consistent trend showing that fact questions enhance learning, though it is not very much of significant level.

144. Stevens, R. "The question as a measure of efficiency in instruction" Teachers College Contribution to Education, 48, p.p. 95, 1912.

The author found that classroom questions in English and social studies place greater emphasis on memory operations. Instead of this, the author suggested that questions should be intelligently used as a mean to develop relective thinking among pupils.

145. Sturgis, D.K. "The relationship of sex, focus of control and study questions to learning from prose material" Dissertation Abstracts International, 36, (2-A), 717-718, 1975.

121 Junior high school students were given a measure of focus of control and the top one thirds of the resulting distribution were termed externals and lowest one thirds as internals. These externals and internals were randomly assigned to two treatment groups. The experimental group received written material in which question were inserted after each passage. The control group received no questions. The results indicated that sex, focus of control and inserted questions are important in learning from written prose material.

146. Swenson, I. and Kulhavy, R.W. "Adjunct questions and the comprehension of prose by children". Journal of Educational Psychology, 66, 2, 212-215 1974.

The study investigated the effect of adjunct questions on 109 fifth and sixth grade pupils. It was revealed that post presentation facilitated learning and retention loss was greatest for one paragraph learners.

147. Taba, H., Levine, S. and Elzey, E. "Thinking in elementary school children" U.S. Office of Education Co-operative Research project no.1574, washington, D.C. 1964.

The study found correlation between the level of teacher's questions and the level of pupil's responses.

148. Taba, H. "Teaching Strategies and cognitive function in elementary school children" United State Office of Education Co-operative Research and Project No.2404, San Francisco, San Francisco State College, 1966.

Taba and her co-workers developed a system of teacher training based on questioning skill. According to the authors, classroom questioning could be used to develop students ability in forming concepts, explaining cause and effect relationships, and explaning implication.

149. Thakar, B.C. "A study of classroom questions and teacher-pupil interaction" Unpublished M.Ed. dissertation, M.S. University, Baroda, 1973.

The study reports that the percentage of memory, translation and interpretation questions asked by Gujarati language teachers comes to 29.3, 1.9 and 3.8 respectively. Further, the study found that the frequency of higher level questions (analysis and synthesis) is significantly higher among trained teachers in comparison to untrained teachers. However, both trained and untrained teachers used narrow questions most of the time.

150. Thiele, J.E. "The effect of adjunct questions and review statements upon learning from audiovisual materials". Dissertation Abstracts International, 34, (5-A), 2465, 1973. Thompson, G.R., and Bowers, N.C. "Fourth grade achievement as related to creativity, intelligence and teaching style. "Paper presented to the American Educational Research Association, 1968.

The study observed teacher's questions on a convergent-divergent continuum. However, for statistical analysis these frequencies were converted into ratios. It has been found that this ratio was highest among teachers with middle achieving student group (F=4.06 P .01).

151. Tisher, R.P. "A study of verbal interaction in science classes and its association with pupils understanding in science". Doctoral dissertation Australia, University of Queensland, 1968.

The investigator observed nine, V111 grade science teachers and administered an achievement test to the pupils taught by them. The study found that a teacher initiating moves which required higher cognitive behaviours does not affect student achievement on factual test and understanding test.

152. Turner, I.H. & Durrett, M.E. "Teacher level of questioning and problem solving in young children. Paper presented at the annual meeting of the American Educational Research Association, Washington. D.C. 1975.

The experimental study was conducted by a single trained teacher in a summer workshop over 13 nursery students, using shaftel photo problems test (shattel & shaftel, 1967), and a Similarties Test (Smothergill, Olson & Moore, 1971). Three treatment periods each lasting for a total of 20

3 hour days in nursery school, were consequtively applied. First treatment condition was of stressing fact questions, second higher cognitive questions, and thirdly having fact questions. Results showed that there were no differences between the pre-test and the post-test following the first fact questions treatment, but there were significantly higher scores for the measures obtained after the high level questions treatment relative to the first and the third fact questions treatment.

153. Torsance, E.P. and Hansen, "The question asking behaviour of highly creative and less creative basic business teachers identified by a paper and pencil test". _Psychological Reports_ 17, 815-810, 1965.

The study found that high creativity teachers differ significantly with regard to the mean frequency of factual and divergent questions form low creativity teachers. The low creativity teachers asked comparitively more factual questions and less divergent questions in the classroom.

154. Urbansek, J. "Multi dimenional approach to predicting effectiveness of complex questioning behaviour" _Psychological Reports_, 39, 1, 131, 134, 1976.

155. Vafe, N.A. "Effects of modelling and microteaching in the acquisition of certain skills in questioning" Doctoral dissertation, M.S. University, Baroda, 1976.

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156. Verma, M.R. and Ansari, M.H. "Classroom behaviour of student teachers" Indian Educational Review. 10, 2, 19-41, 1975.

The study found 8.81% of total tallies in category '4' (asks question) in Flander Interaction Analysis category system. The TQR was 22.75.

157. Vasistha, K.K."An experimental study of the change in some characteristics and verbal behaviour of secondary science and mathematics student teachers through the training in verbal interaction technique". Doctoral Dissertation, Meerut University, Meerut, 1976.

The study observed 120 student teachers studying in secondary teacher education institutions who have offered science and mathematics as their teaching subjects. It was found that training in interaction analysis produces a significant gain in teacher question ratio.

158. Vasistha, K.K. "Effectiveness of interaction analysis on verbal teaching behaviour of prospective teachers" Indian Educational Review, 12, 2, 11-115, 1977.

Using an experimental pretest-posttest design, the investigator found non-significant t-value (1.37237) for category '4' (asks questions) of FIACS. This revealed that training in FIAVS may not contribute to the change in questioning frequency.

159. Wilson, R.M. "Comprehension diagnosis, *Reading World*, 14, 1, 49-50, 1974.

The paper emphasises the need to reduce the memory burden on children so that they may concentrate on other aspects of comprehension.

160. Wright, C.J. and Nuthall, G. "Relationship between teacher behaviours and pupil achievement in three experimental science lesson" American Educational Research Journal, 7, 477-93, 1970.

The investigators studied the relationship between various teacher cognitive behaviours and pupil achievement and found both significant and non-significant results.

161. Yamada, S. "A study of questioning" *Pedagogical Seminary*, 20, 129-85, 1913.

162. Zillmann, D. and Cantor, J.R. "Instruction of University via rhetionical questions and its effect on the learning of factual materials" *British Journal of Educational Psychology*, 43, 2, 172-180, 1973.

The study found that the frequency of rhetionical questions in the lecture enhances the learning and recall of facts.